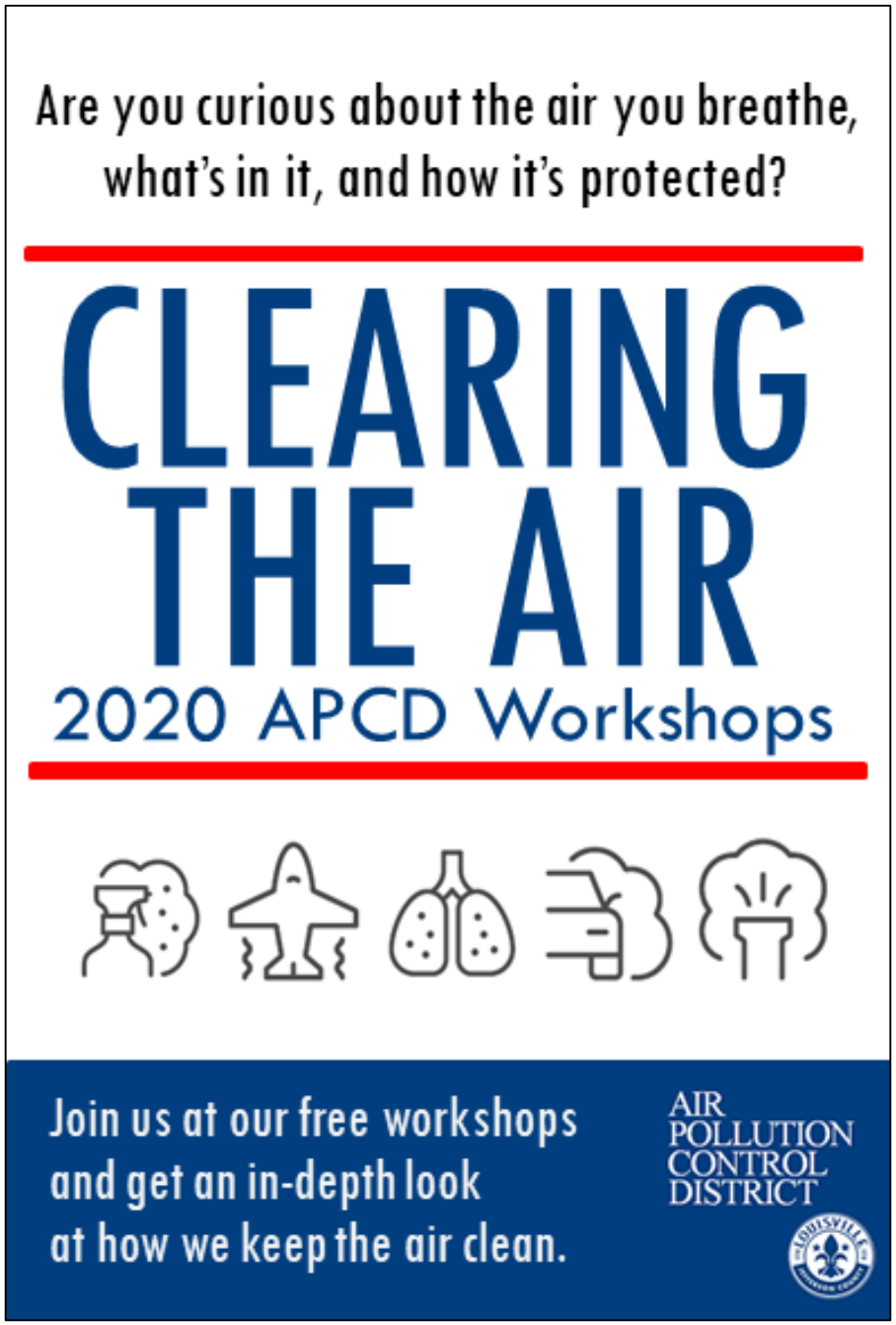


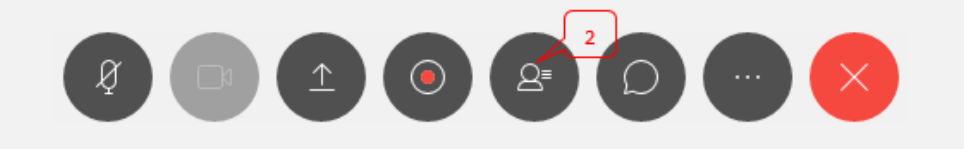
Welcome to the APCD 2020 *Clearing the Air* workshop series!

Please stand-by, the workshop will begin shortly.

Note: All attendee phone lines are muted. Today's workshop is being recorded.

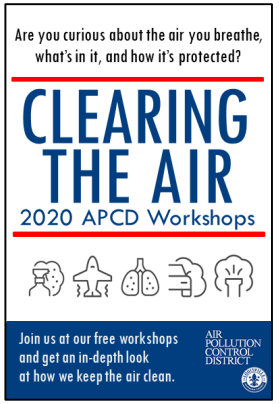
Webinar Tips

- To access controls while viewing the presentation, hover over the bottom of your screen.



- Please utilize the Chat feature to submit your questions.

- If ***only*** connecting by telephone, you will not have access to the Chat feature. Please email your questions to *clearingtheair@louisvilleky.gov*.



CLEARING THE AIR

2020 APCD Workshops

The **APCD Workshop Series** seeks to:

1. Improve the community's understanding of APCD's role in improving Louisville's air.

2. Empower community with information.

3. Offer an informal setting/environment for dialogue, discussion and feedback.

4. Build relationships.

CLEARING THE AIR

2020 APCD Workshops

Today's workshop seeks to:

1. Provide an overview of ground-level ozone and the impacts it has on public health.

2. Review the current NAAQS for ground-level ozone in Louisville.

3. Discuss efforts being made to develop strategies that reduce ozone and find co-benefits that reduce other pollutants.

CLEARING THE AIR

2020 APCD Workshops

AIR POLLUTION CONTROL DISTRICT

Remember…

- There are **NO** silly questions

- Interactive/informal workshop
  - Ask questions as they come to mind
  - Feedback? Email *Clearingtheair@louisvilleky.gov*

Ozone: What is it and why we need to know

Air Pollution Control District

Ground-level Ozone – What is it?

Ground-level Ozone vs. Stratospheric Ozone

- Ground-level Ozone
  - "Bad" ozone
  - Colorless
  - Highly irritating gas
  - Forms just above the earth's surface
  - Secondary pollutant
    - Created via a chemical reaction
- Stratospheric Ozone
  - "Good" ozone
  - Stratospheric layer protects from the sun's ultraviolet rays

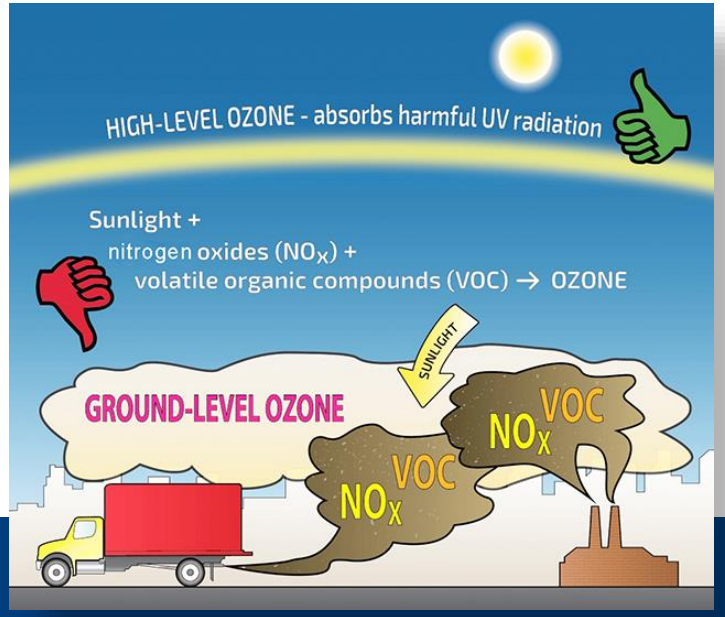
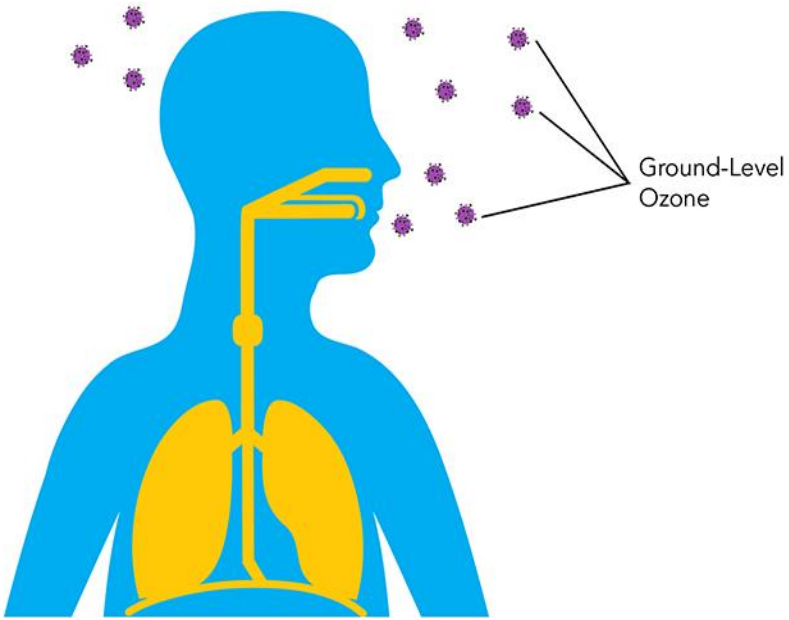


Photo: Washington State Department of Ecology

Health Effects



IF YOU ARE ACTIVE AND EXERCISE OUTDOORS...

OZONE CAN CAUSE YOU BREATHING DIFFICULTY AND EYE IRRITATION.

IF YOU ARE YOUNG OR ELDERLY...

OZONE CAN CAUSE REDUCED RESISTANCE TO LUNG INFECTIONS AND COLDS.

IF YOU ARE ASTHMATIC...

OZONE CAN TRIGGER ATTACKS.

IF YOU SUFFER FROM RESPIRATORY ILLNESS...

OZONE CAN CAUSE WORSENED SYMPTOMS OF COPD (CHRONIC OBSTRUCTIVE PULMONARY DISEASE) OR CHRONIC BRONCHITIS

https://simplestepsbetterair.org/get-smart-about-ozone/

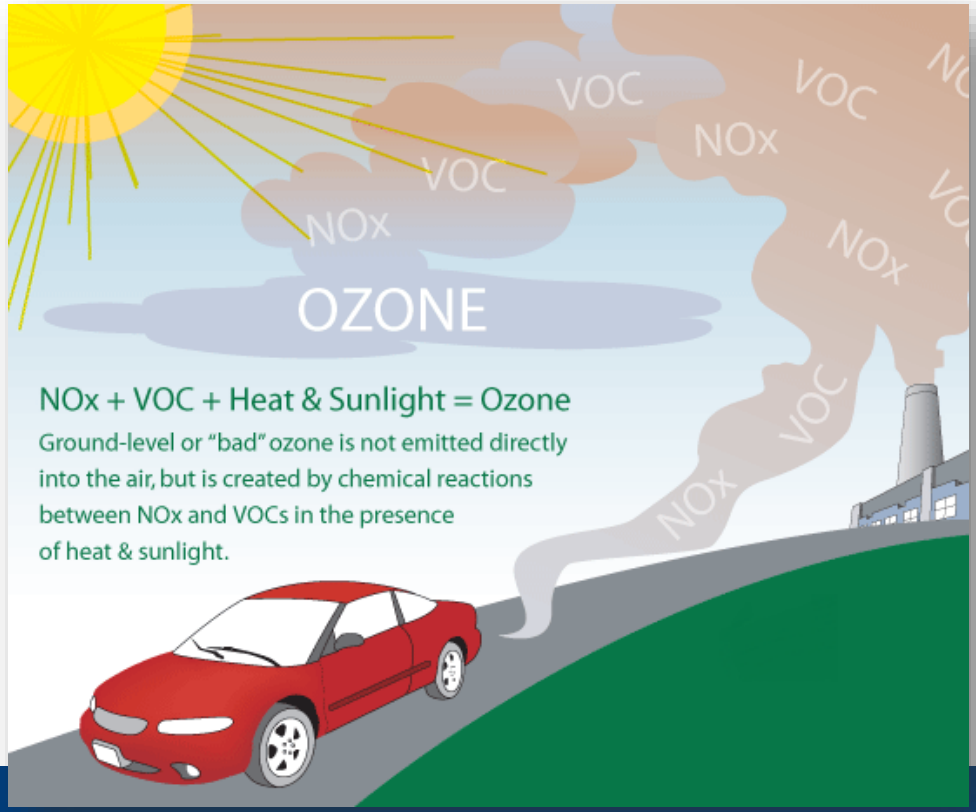
Environmental Effects

- Impacts sensitive vegetation and ecosystems
  - Slows plant growth
  - Increases plant risks of disease or infection
  - Reduces photosynthesis
- Loss of species diversity
- Changes habitat quality

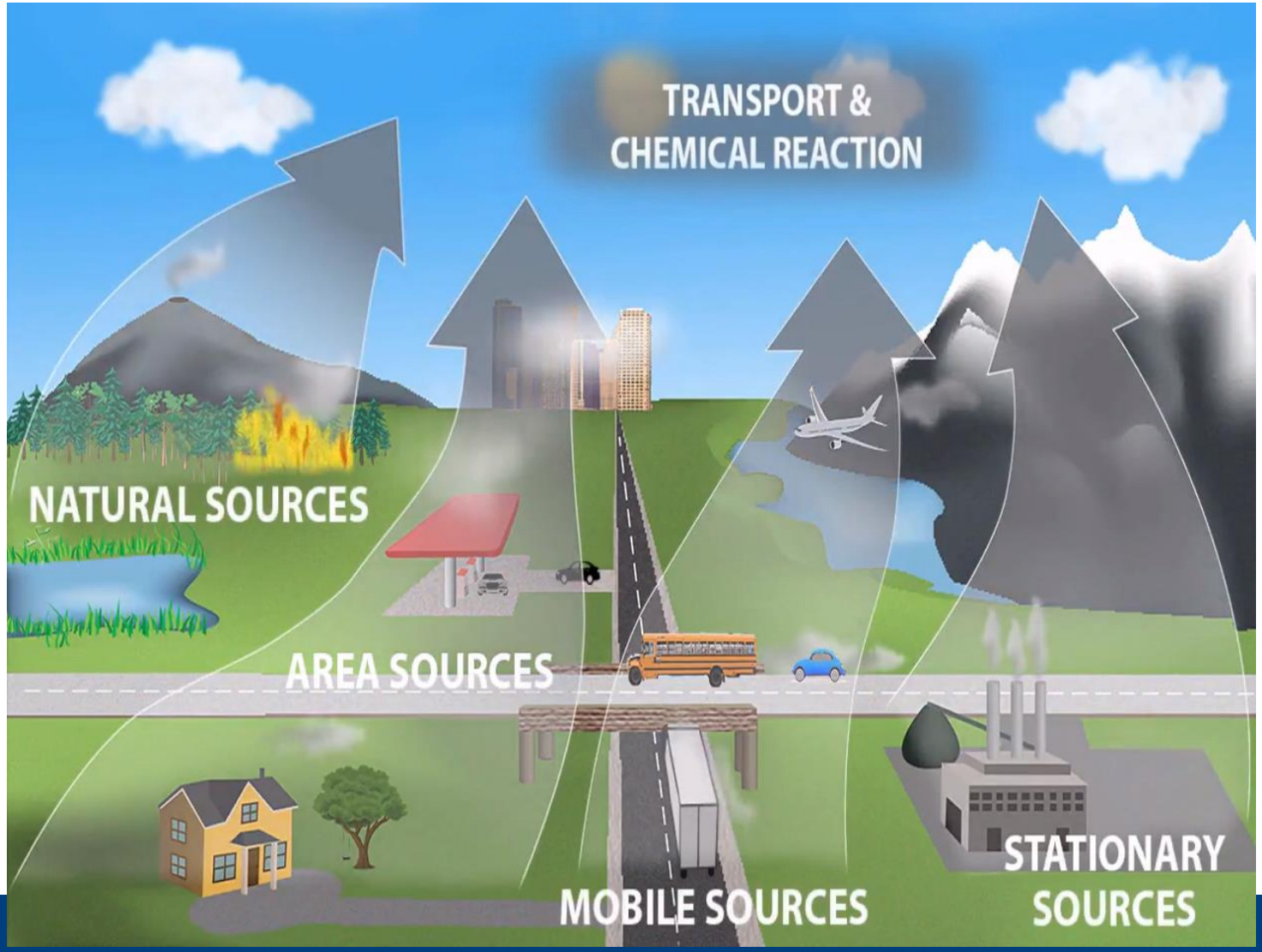
Photos: Black Cherry and Tulip Poplar

How is ground-level ozone formed?

Ground-level Ozone: **NO_x + VOCs + Sunlight = O_3**



Where do emissions come from?



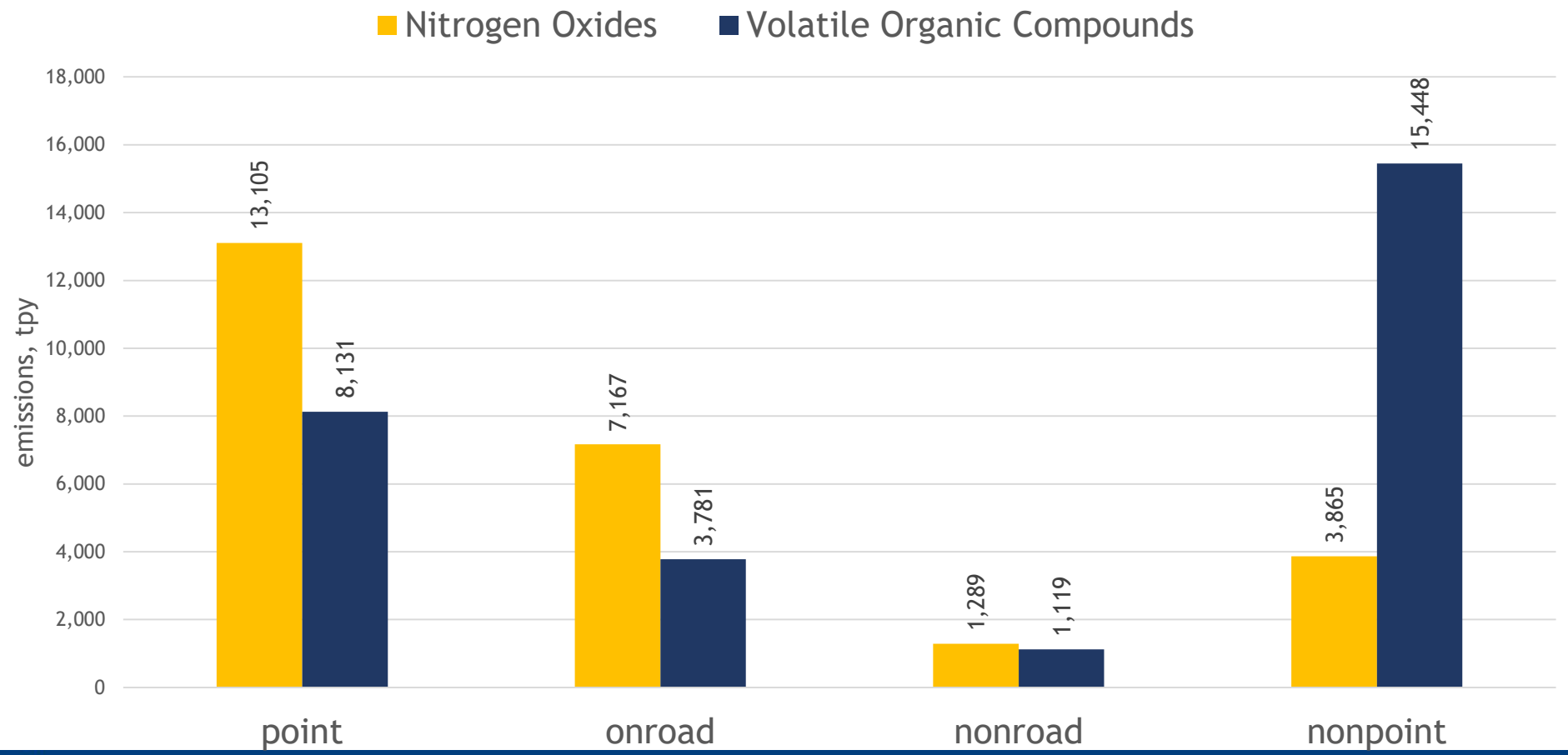
Oxides of Nitrogen (NO_x)

- From a family of poisonous, highly reactive gases
- Primarily gets in the air from the burning of fuel
- **Contributes to the formation of ground-level ozone ("ozone precursor")**
- Sources: Emitted from cars, trucks, buses, power plants, and off-road equipment

Volatile Organic Compounds (VOCs)

- Organic compounds that easily become vapors or gases
- **NOT** a criteria pollutant
- Sources: Gasoline engines and fueling, solvents, paints, consumer products

Breakdown of Emissions from Ozone Precursors



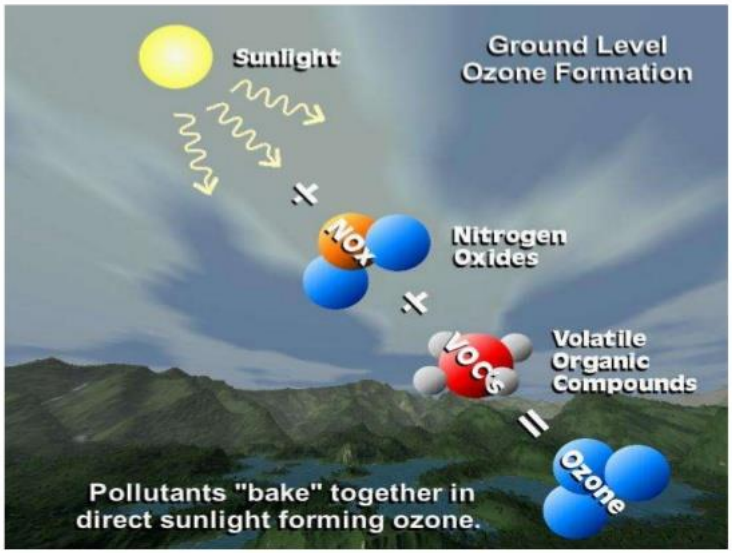
AIR POLLUTION CONTROL DISTRICT

Data from 2017 National Emissions Inventory

Meteorology

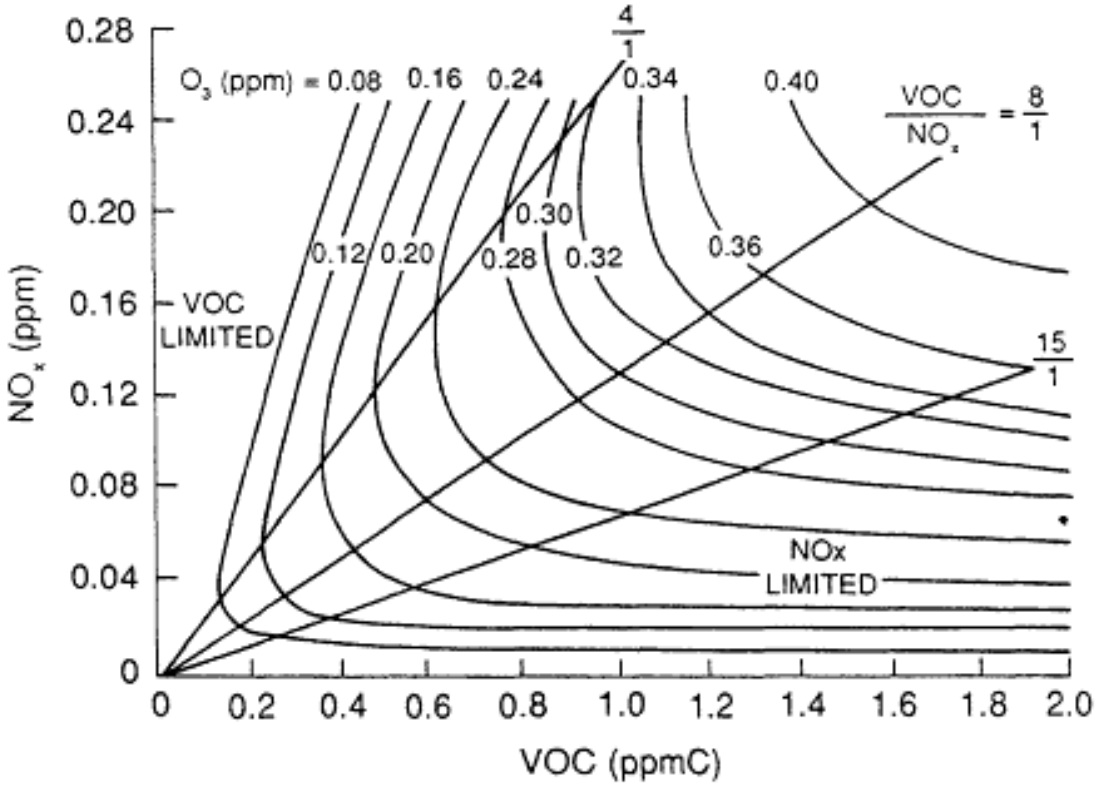
- Assists with the chemical reaction that creates “bad” ozone (*i.e.* sunlight)
- Warm, sunny, dry and stagnant days can create more ground-level ozone
- Can move through a region slowly and accumulate in areas downwind of sources

Chemistry



Ozone Formation

- NO_X + VOCs + Sunlight



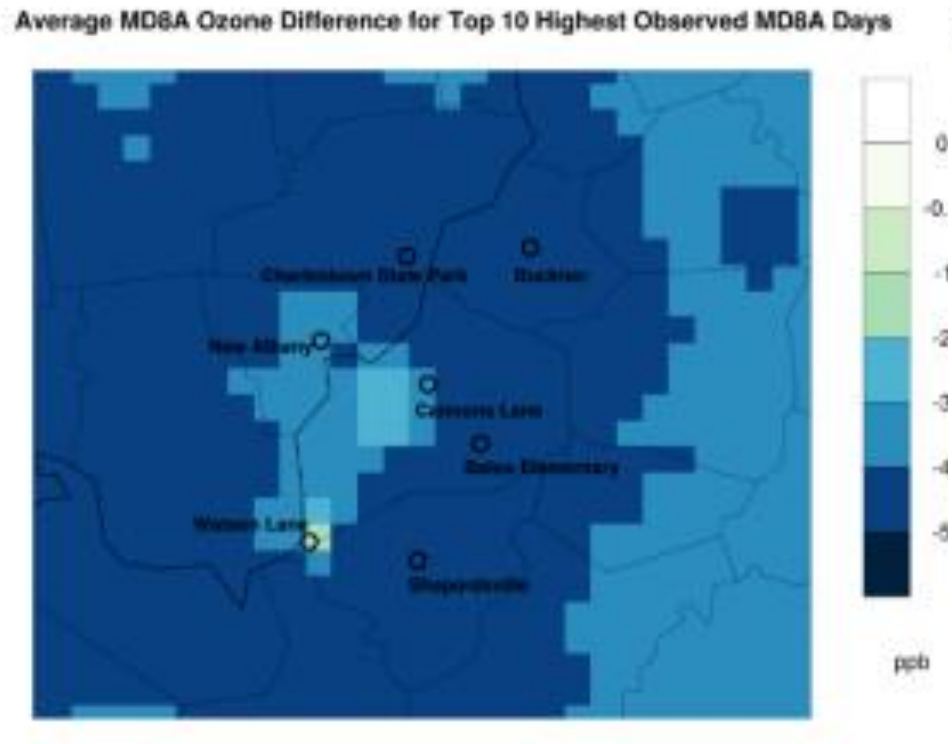
Ozone Formation

Ozone Formation Study

Goal	Outcomes
• Refine understanding for the regional drivers of ozone formation to make strategic policy decisions	• Comprehensive inventory of compounds contributing to the formation of ozone • Refined understanding of Ozone sensitivity to NOx/VOC reductions • *Scale of relative reactivities of VOCs in the ambient air of Jefferson County*

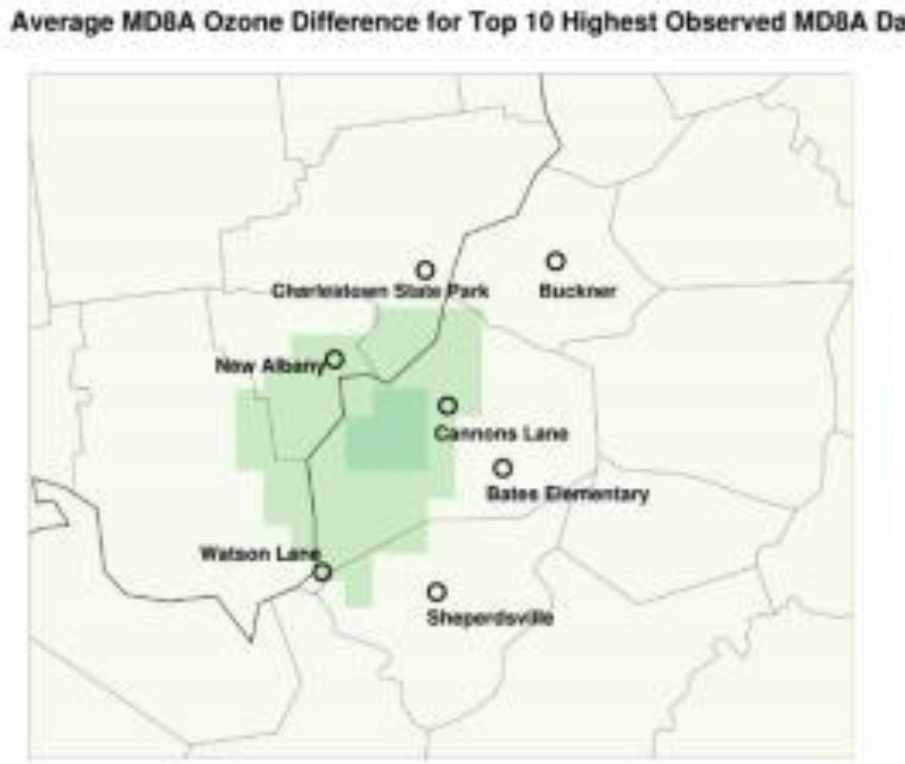
Ozone Formation Study - Results

NOx Sensitivity



The darker the shade of blue, the more O_3 lowered in response to an across the region **NOx** reduction.

VOC Sensitivity



The darker the shade of blue, the more O_3 lowered in response to an across the region **VOC** reduction.

Louisville's Ozone Status

Monitoring and Communicating Ozone Air Quality Data

- EPA National Ambient Air Quality Standards (NAAQS)

- APCD air monitoring network

- Air Quality Index (AQI)

National Ambient Air Quality Standards

- The Clean Air Act requires EPA to set NAAQS (40 CFR part 50)
- EPA sets NAAQS for **six principal pollutants,** which are called **"criteria" air pollutants:**
  - Carbon Monoxide
  - Lead
  - Particulate Matter
  - Oxides of Nitrogen
  - Sulfur Dioxide
  - Ozone

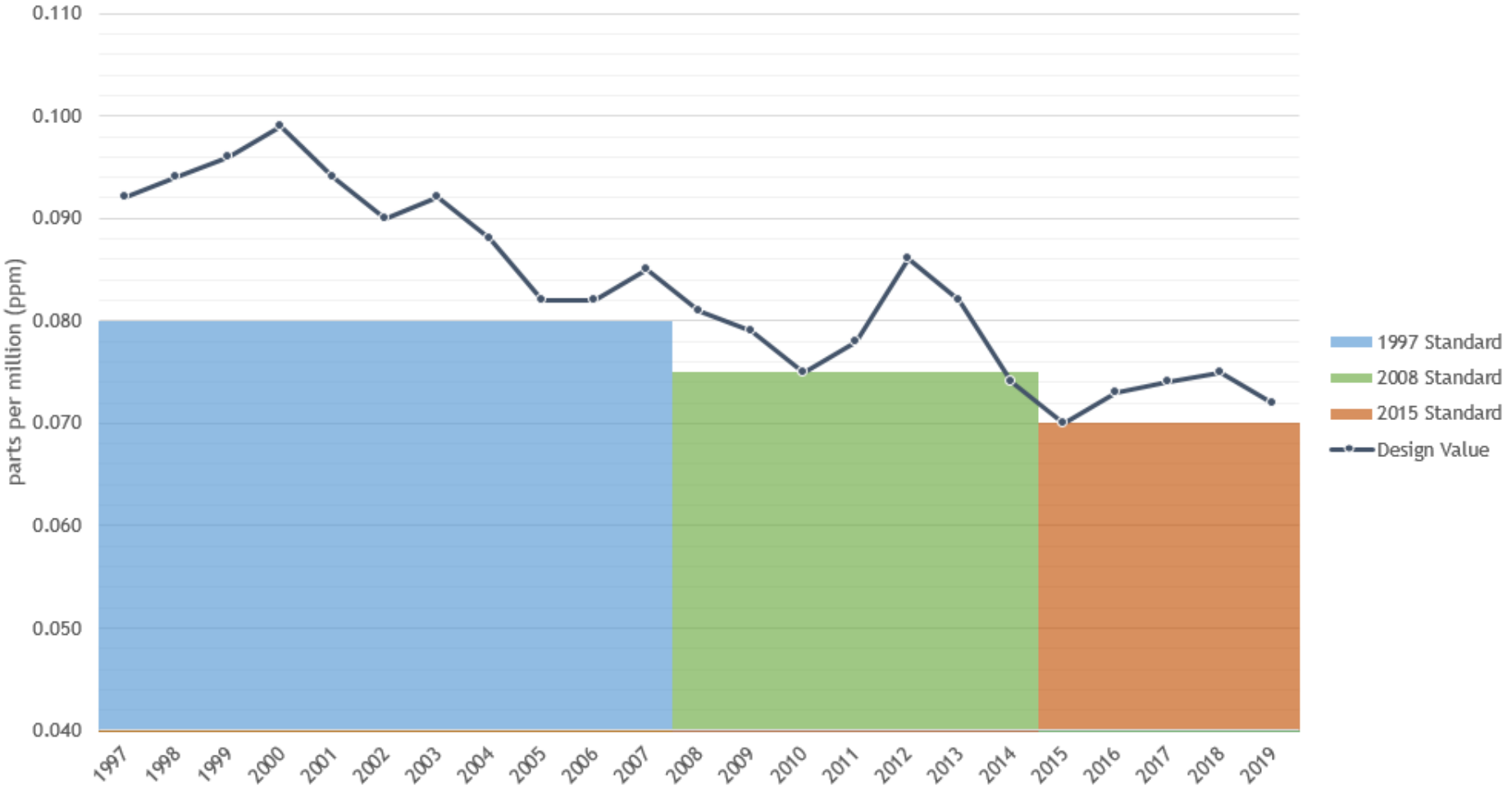
NAAQS

Pollutant [links to historical tables of NAAQS reviews]		Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide (CO)		primary	8 hours	9 ppm	Not to be exceeded more than once per year
			1 hour	35 ppm	
Lead (Pb)		primary and secondary	Rolling 3 month average	0.15 µg/m^3 (1)	Not to be exceeded
Nitrogen Dioxide (NO_2)		primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		primary and secondary	1 year	53 ppb (2)	Annual Mean
Ozone (O_3)		primary and secondary	8 hours	0.070 ppm (3)	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particle Pollution (PM)	$PM_{2.5}$	primary	1 year	12.0 µg/m^3	annual mean, averaged over 3 years
		secondary	1 year	15.0 µg/m^3	annual mean, averaged over 3 years
		primary and secondary	24 hours	35 µg/m^3	98th percentile, averaged over 3 years
	PM_{10}	primary and secondary	24 hours	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide (SO_2)		primary	1 hour	75 ppb (4)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		secondary	3 hours	0.5 ppm	Not to be exceeded more than once per year

Louisville's NAAQS Status

Pollutant	Standard	Averaging Time	Louisville's Status
Carbon Monoxide	9 ppm	8-hour	Attainment
	35 ppm	1-hour	Attainment
Lead	0.15 $\mu g/m^3$	Rolling 3-month Average	Attainment
Nitrogen Dioxide	53 ppb	Annual Average	Attainment
	100 ppb	1-hour	Attainment
Particulate Matter (PM10)	150 $\mu g/m^3$	24-hour	Attainment
Particulate Matter (PM2.5)	12.0 $\mu g/m^3$	Annual Average	Attainment
	35 $\mu g/m^3$	24-hour	Attainment
Ozone	0.070 ppm	8-hour	Nonattainment
Sulfur Dioxide	75 ppb	1-hour	Attainment

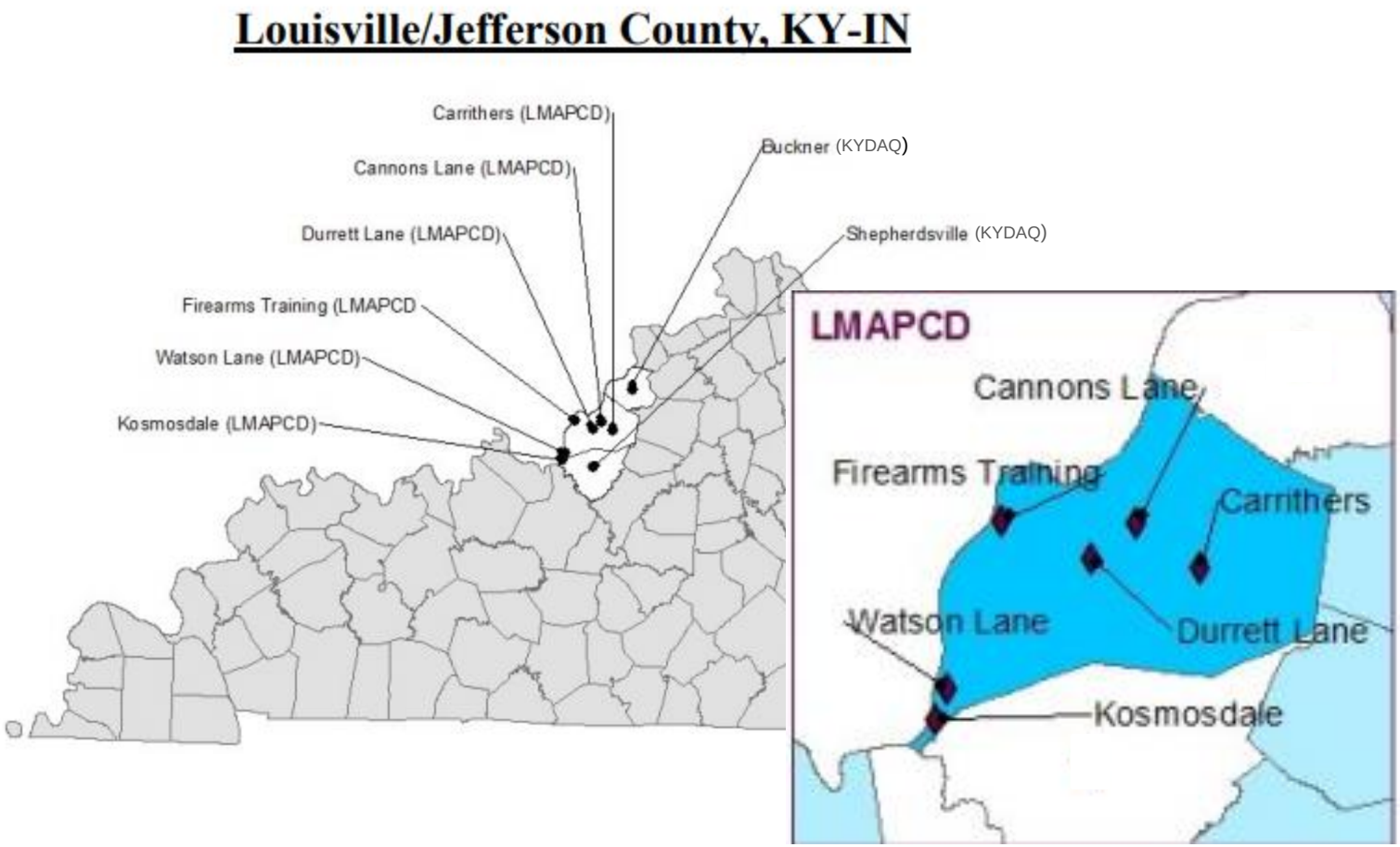
Louisville's Ozone Trend



AIR POLLUTION CONTROL DISTRICT

*Ozone design value is the annual 4th highest eight-hour average concentration, averaged over three years

Monitoring for Jefferson County, KY



Air Quality Index (AQI)

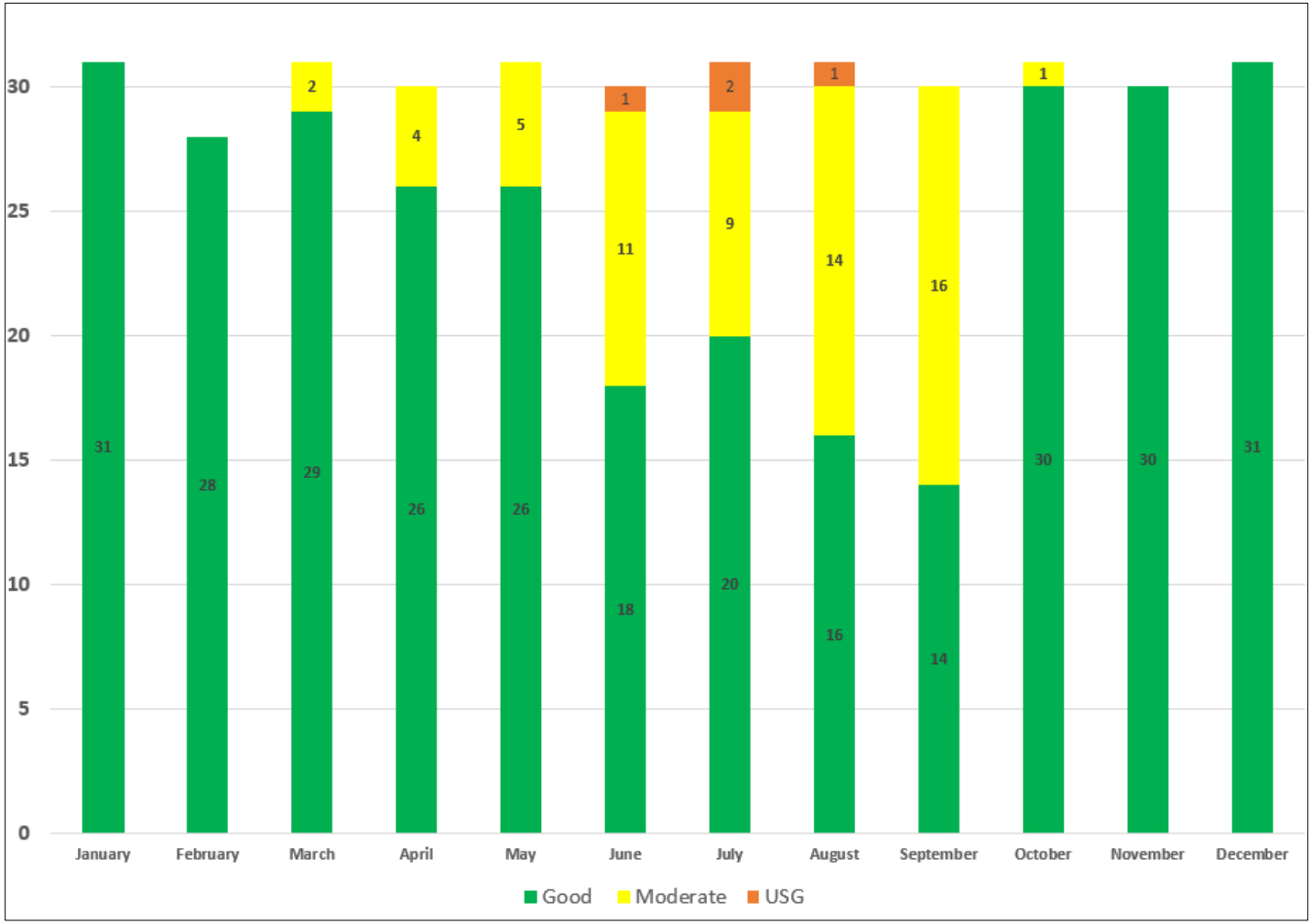
- Created to provide daily analysis and reporting of air quality in a uniform manner
- The AQI is calculated for **four** Criteria Pollutants:
  - Ozone
  - Particle pollution
  - Carbon monoxide
  - Sulfur dioxide

- AQI value of 100 generally corresponds to the NAAQS. **At or below 100 are generally thought of as satisfactory**.

A Guide to the AQI

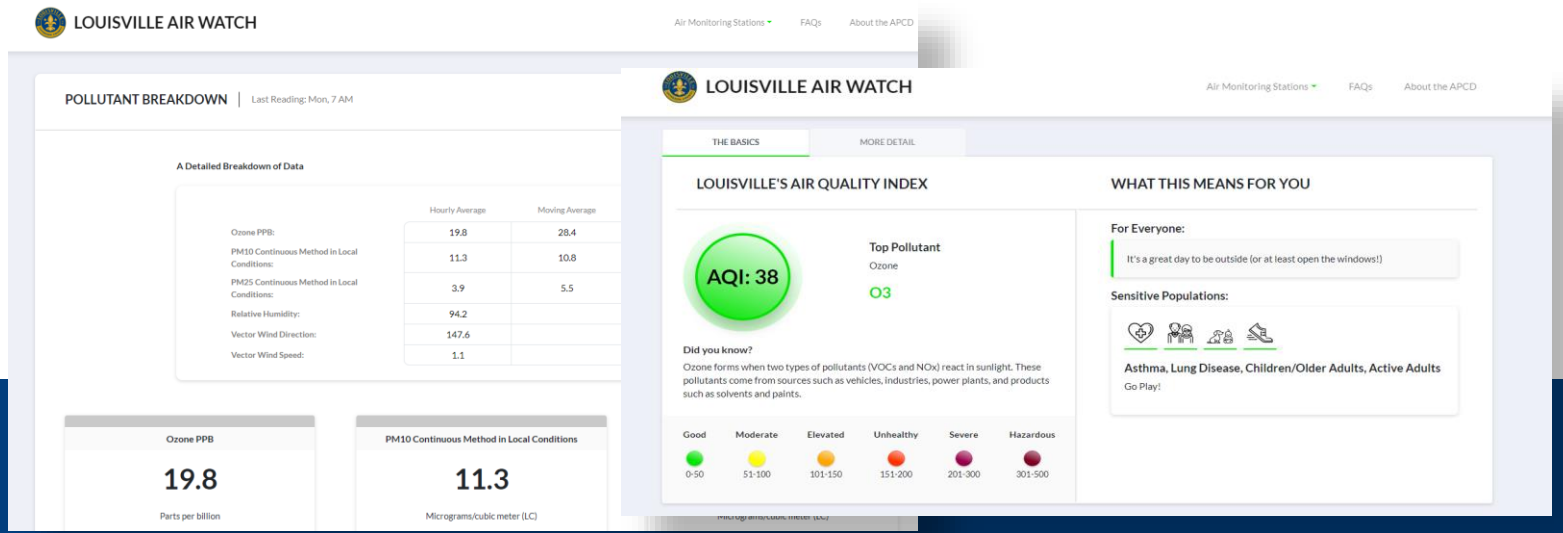
Air Quality Index	Who Needs to be Concerned?	What Should I Do?
Good 0-50	It's a great day to be active outside.	
Moderate 51-100	Some people who may be unusually sensitive to particle pollution.	**Unusually sensitive people:** *Consider reducing* prolonged or heavy exertion. Watch for symptoms such as coughing or shortness of breath. These are signs to take it easier. **Everyone else:** It's a good day to be active outside.
Unhealthy for Sensitive Groups 101-150	Sensitive groups include **people with heart or lung disease, older adults, children and teenagers.**	**Sensitive groups:** *Reduce* prolonged or heavy exertion. It's OK to be active outside, but take more breaks and do less intense activities. Watch for symptoms such as coughing or shortness of breath. **People with asthma** should follow their asthma action plans and keep quick relief medicine handy. **If you have heart disease:** Symptoms such as palpitations, shortness of breath, or unusual fatigue may indicate a serious problem. If you have any of these, contact your heath care provider.
Unhealthy 151 to 200	**Everyone**	**Sensitive groups:** *Avoid* prolonged or heavy exertion. Move activities indoors or reschedule to a time when the air quality is better. **Everyone else:** *Reduce* prolonged or heavy exertion. Take more breaks during all outdoor activities.
Very Unhealthy 201-300	**Everyone**	**Sensitive groups:** *Avoid all* physical activity outdoors. Move activities indoors or reschedule to a time when air quality is better. **Everyone else:** *Avoid* prolonged or heavy exertion. Consider moving activities indoors or rescheduling to a time when air quality is better.
Hazardous 301-500	**Everyone**	**Everyone**: *Avoid all* physical activity outdoors. **Sensitive groups:** Remain indoors and keep activity levels low. Follow tips for keeping particle levels low indoors.

Louisville's 2019 Ozone Daily AQI



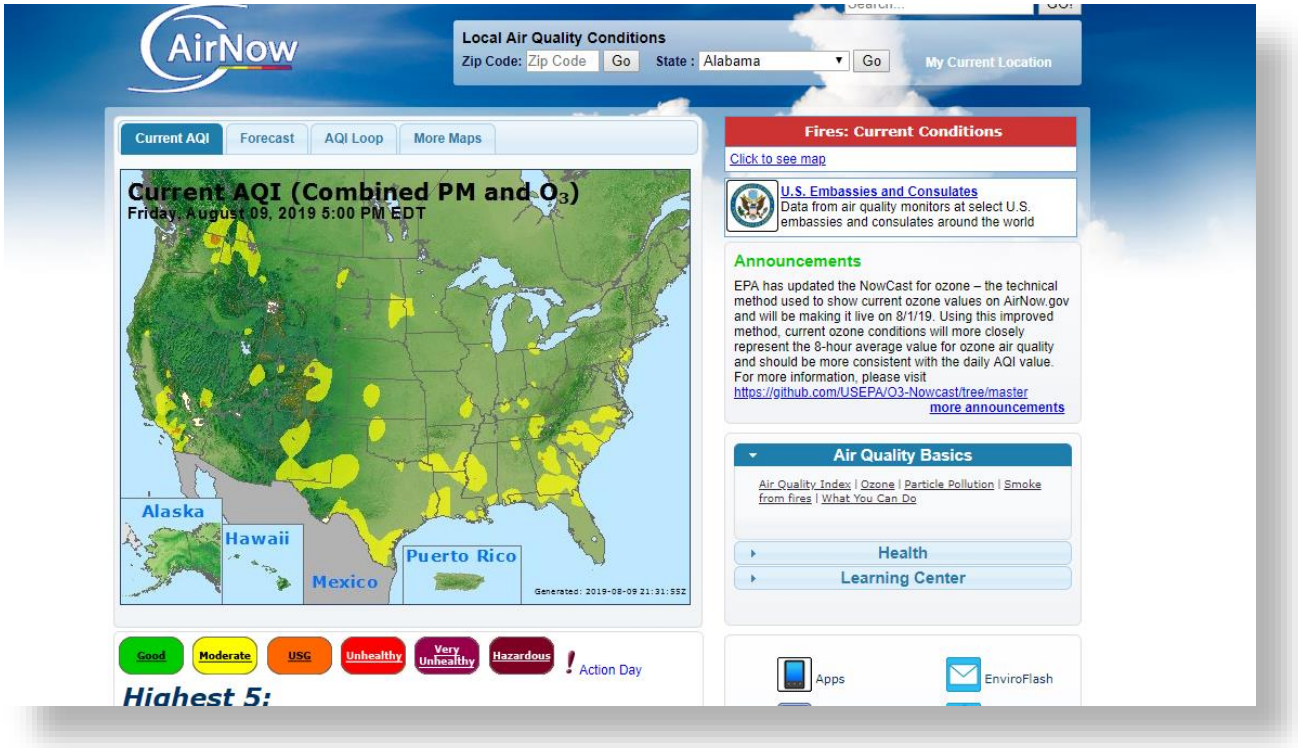
Louisville Air Watch

- The official ambient air quality information web map for the Louisville Metro Air Pollution Control District
  - Provides real-time air monitoring data from EPA-approved air monitors
  - Provides data on air pollution levels for criteria pollutants (O_3, PM, SO_2, CO and NO_2)



AIR POLLUTION CONTROL DISTRICT

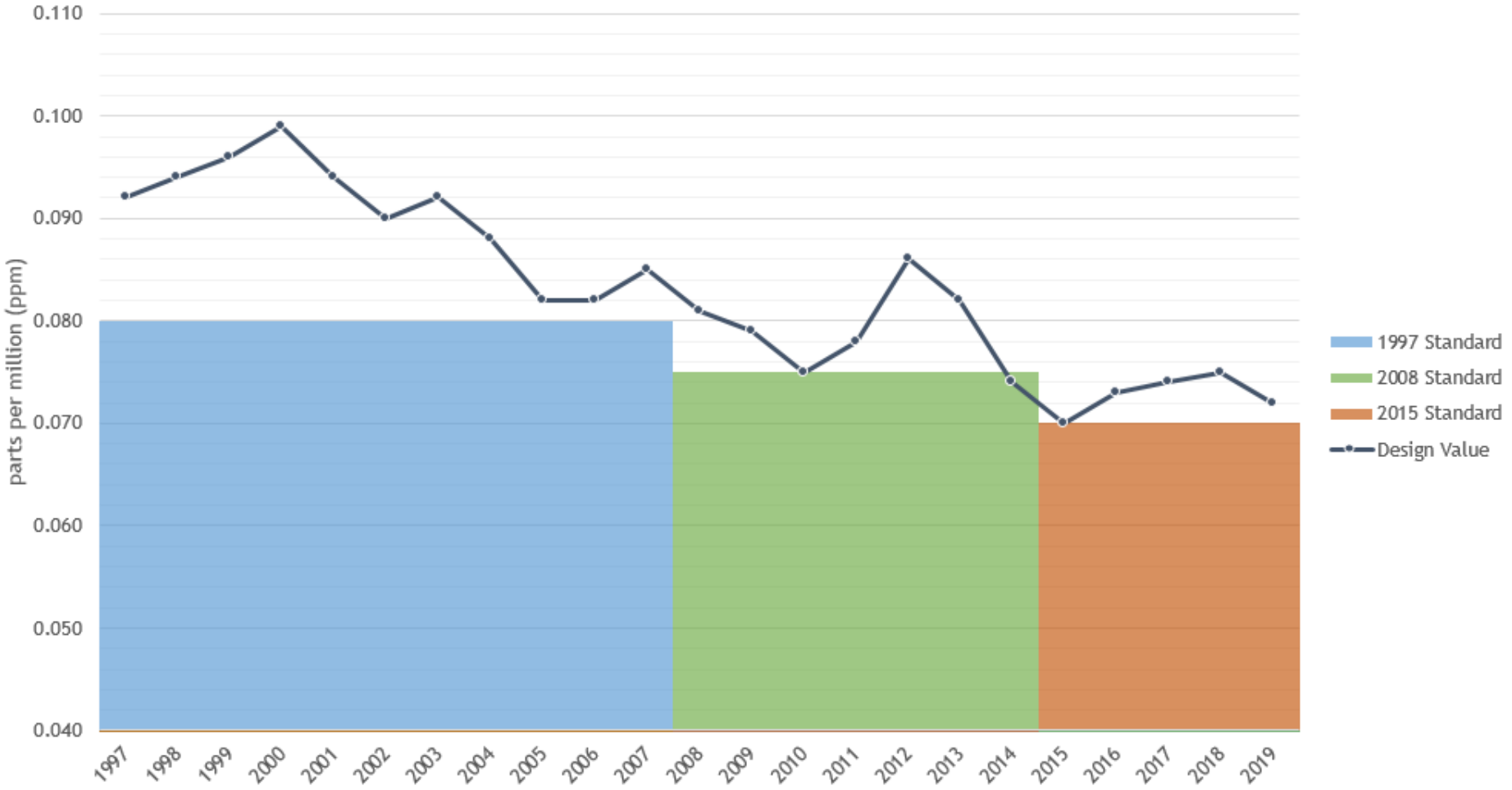
AirNow



- Offers daily AQI conditions for over 300 cities in the U.S.
- Provides the public with air quality forecasts

Ozone: What comes next?

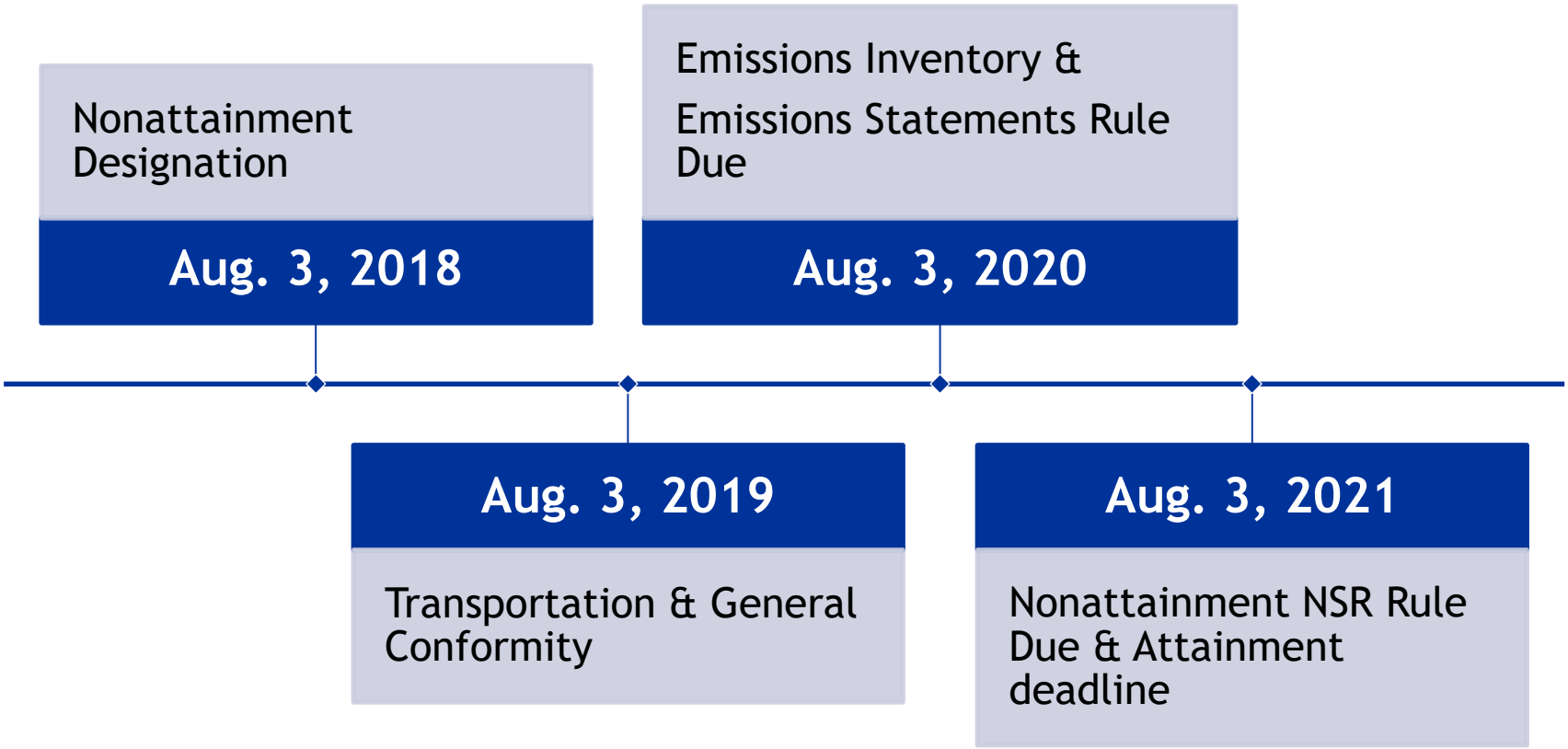
Louisville's Ozone Trend



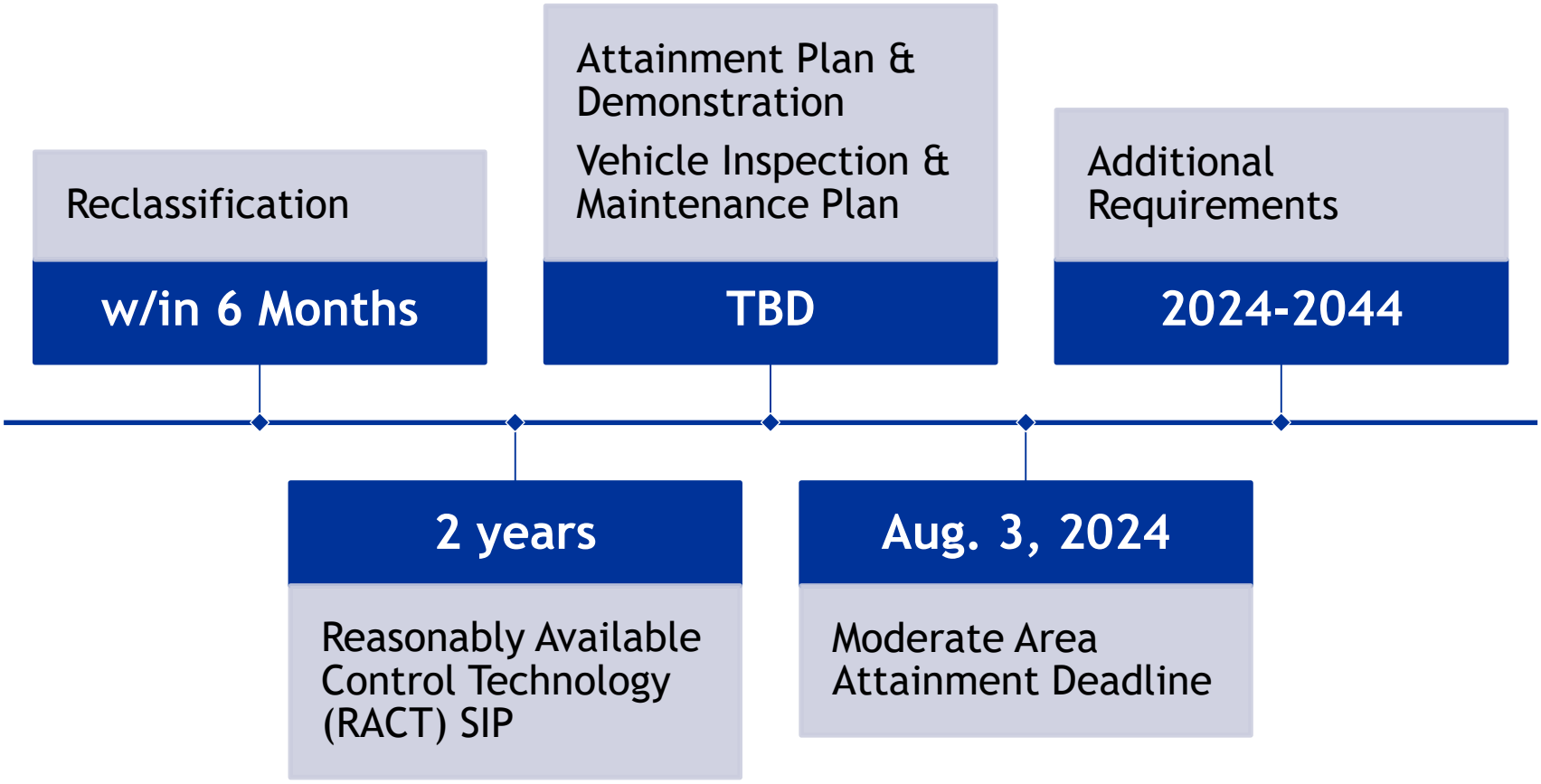
AIR POLLUTION CONTROL DISTRICT

*Ozone design value is the annual 4th highest eight-hour average concentration, averaged over three years

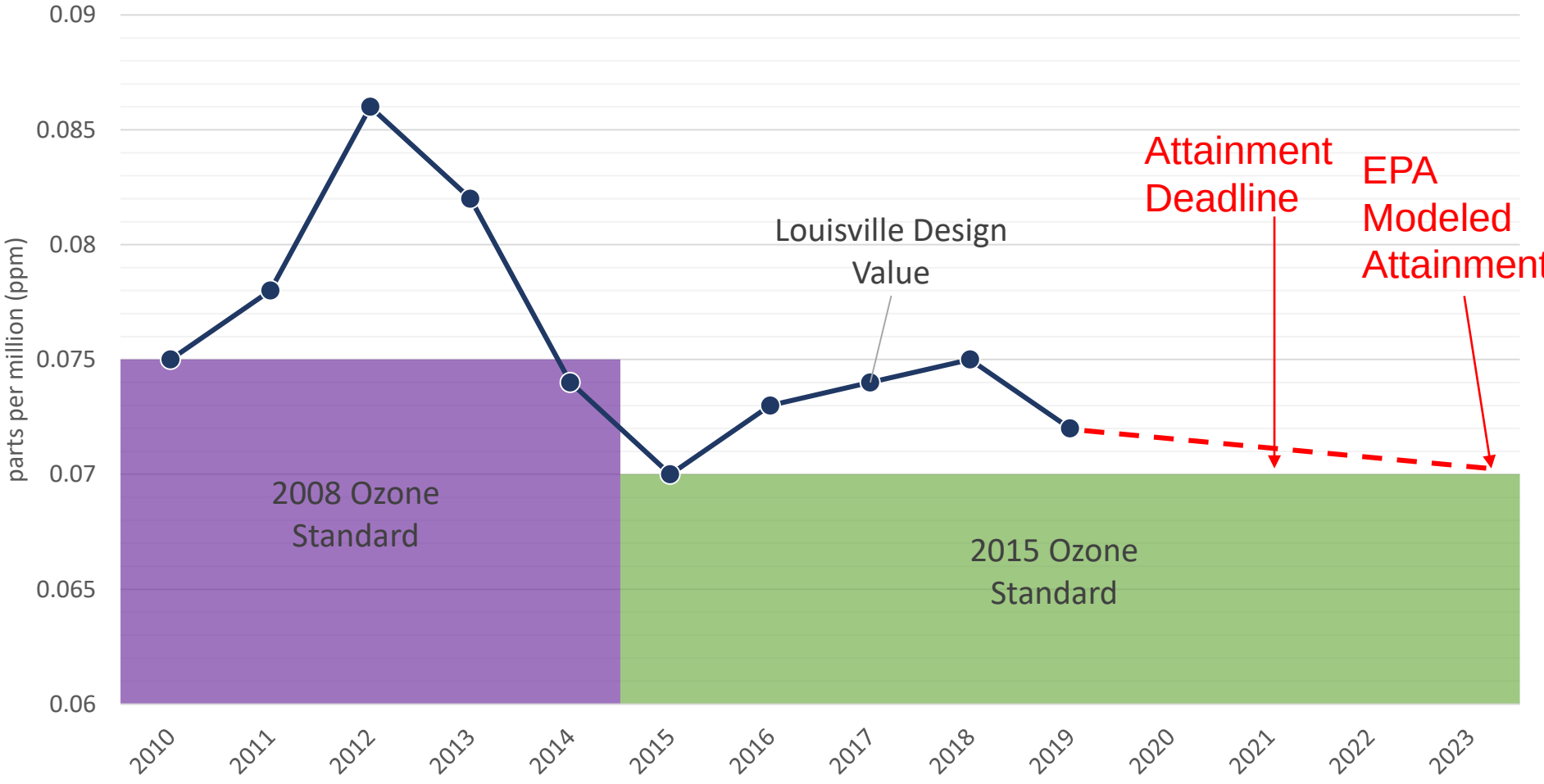
SIP Planning – Marginal Nonattainment



SIP Planning after failure to attain



Ozone Projections



Reducing Ozone Pollution

Addressing Ozone Pollution

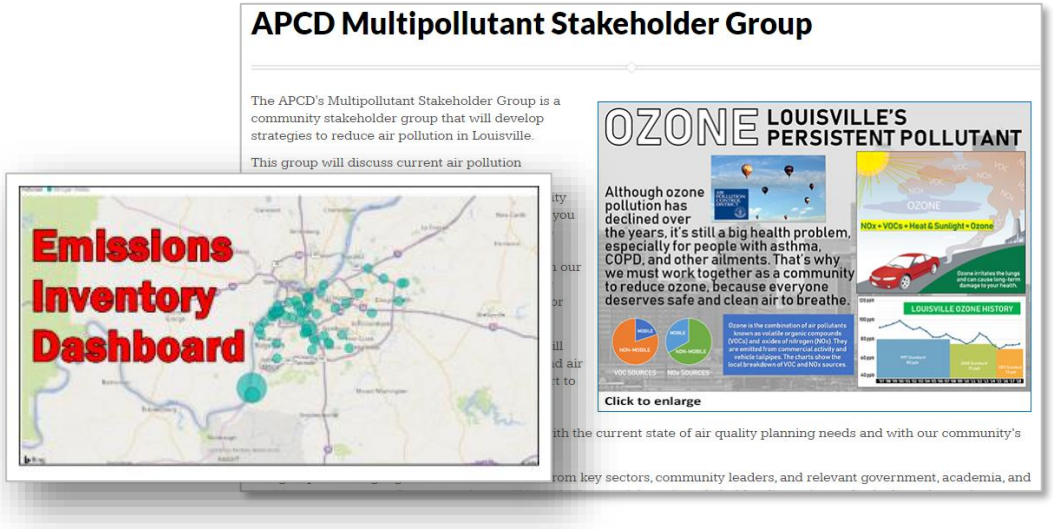
- Ozone Formation Study
- Regulatory (SIP) Planning
- Multipollutant Stakeholder Group
- Sustainability Initiatives
- KAIRE – Idle Free
- Grow More Mow Less
- Lawn Care for Cleaner Air
- Energy Efficiency

Multipollutant Stakeholder Group

- Develop recommendations to **reduce emissions** of ozone precursors, air toxics, and fine particulate reductions through regulatory, policy, and voluntary initiatives.
- Identify initiatives to **reduce air pollution exposure and health risks**.
- Recommend programs, collaborations, etc. that will **raise awareness of air quality and health impacts of local activities**.

MPSG Process

- Kicked off in November 2019
  - Representatives from 36 entities or organizations
  - Reviewed air quality and emission inventory data, ozone formation science, and goals
- Committee Meetings
  - 5 Committees with more than 60 participants
  - 37 Committee meetings December 18th through March 13th
  - **Developed more than 90 Recommendations**



MPSG Final Report

- A comprehensive resource on Louisville's Air Quality
- A record of the MPSG process and the discussion leading to Recommendation development
- Documents all Recommendations and feedback received

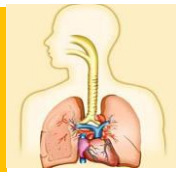
Example Recommendations

Point Source Committee

Area Source Committee

Mobile Source Committee

Health Committee



Outreach & Education Committee

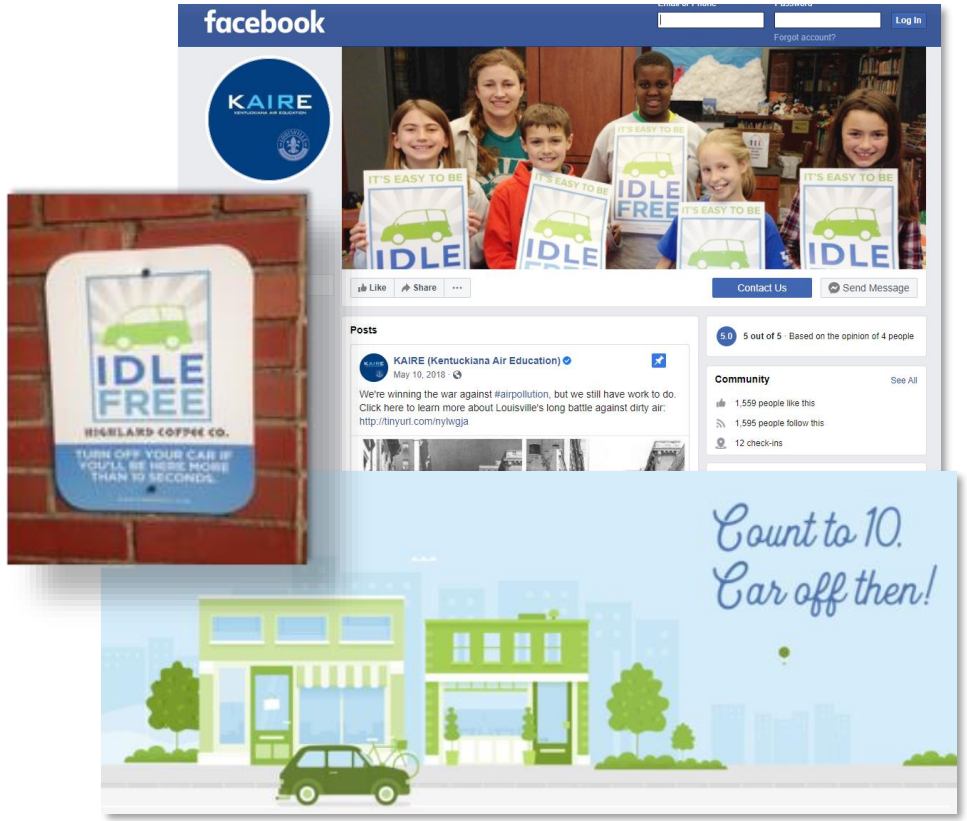
- Encourage action by Point Sources on Air Quality Alert Days, including recommending sources have an Air Quality Alert Day Plans.
- Encourage work practice changes/upgrades for equipment, technology, chemicals, and input materials at area sources through outreach and education and financial assistance when available.
- Expand Electric Vehicle (EV) adoption and expand EV infrastructure.
- Louisville Metro Government should prioritize urban heat island mitigation strategies that also improve air quality such as vegetative solutions.
- Ensure air quality info (local specific) is available for inclusion in science curriculum.

Other LMG Initiatives

- Move Louisville
  - Louisville's 20-year multi-modal plan
  - Seeks to reduce number of miles we drive; provide and improve mobility options
- Drive Clean Louisville
  - LMG team planning for and exploring opportunities related to EVs and clean fuel transportation
  - Greening LMG fleet – Green Fleet Challenge
- Sustain Louisville
  - GHG emissions reduction goals

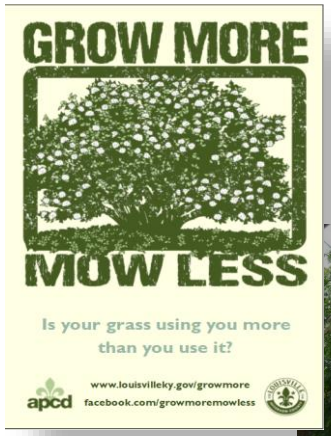
In My Car – KAIRE

- Outreach to increase awareness of the impact individual choices have on local air quality
  - Idle Free Program
  - Transportation Options
    - Bike, walk, drive an EV/Hybrid, carpool or rideshare (Every Commute Counts)



EVERY COMMUTE COUNTS

In My Yard – GMML



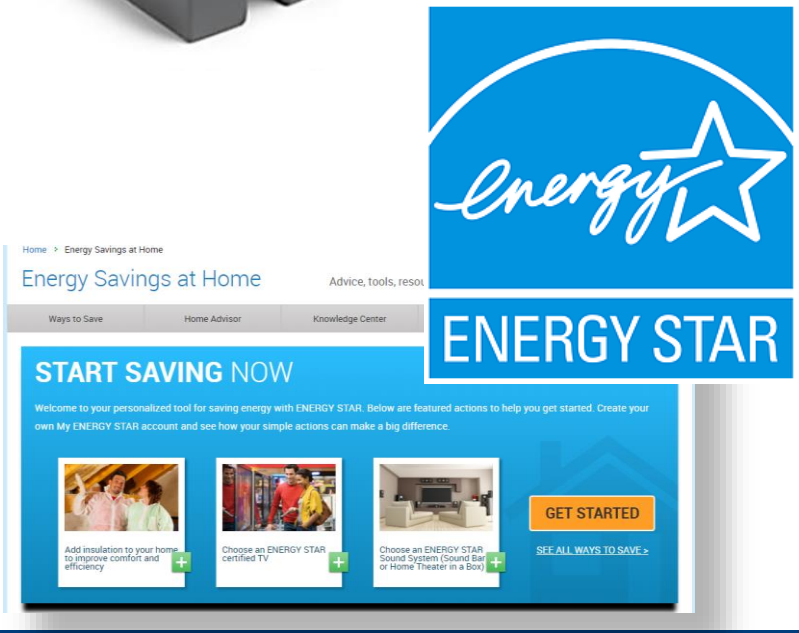
- **Grow More Mow Less**
  - Replace grass with low-mow landscaping (*e.g.* trees, shrubs, bushes, flowers, ground cover, etc.); no need to mow
  - Numerous co-benefits: storm water management increased habitat for wildlife, reduction of urban heat

In My Yard – LCCA

- **Lawn Care for Cleaner Air**
  - Program providing **rebates** to replace gas-powered lawn equipment with cleaner electric and/or human-powered lawn equipment.
  - Electric lawn equipment reduces harmful lawn-related air emissions

In My Home

- Decrease the use of consumer products that emit harmful VOCs (*e.g.* paints, solvents, air fresheners, aerosol sprays)
- Invest in energy efficient appliances, LED lighting, programmable thermostats, etc.



Questions?

Louisville Metro
Air Pollution Control District

701 W. Ormsby Ave.
Suite 303
Louisville, KY 40203

(502) 574-6000
air@louisvilleky.gov
www.louisvilleky.gov/APCD

Keith H. Talley Sr., Director

Resources

Air Pollution Control District

Louisvilleky.gov/APCD

Environmental Protection Agency (EPA)

Epa.gov/ground-level-ozone-pollution/ground-level-ozone-basics

Epa.gov

Epa.gov/Region4

Department of Energy

https://www.energy.gov/energysaver/energy-saver

Louisville Air Watch

Airqualitymap.louisvilleky.gov/

AirNow

Airnow.gov/

Kentucky Division of Air Quality

Air.ky.gov

Energy Star

https://www.energystar.gov/

Resources

KAIRE

Helptheair.org
Facebook.com/helptheair
Twitter.com/helptheair

Lawn Care for Cleaner Air

Louisvilleky.gov/government/lawn-care-cleaner-air

Grow More Mow Less

Louisvilleky.gov/government/air-pollution-control-district/grow-more-mow-less

Facebook.com/GrowMoreMowLess

https://www.energy.gov/energysaver/energy-saver